

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

## DIPLOMA PROGRAMME IN MINING ENGG.

### SEMESTER - V

#### COURSE OF STUDY AND SCHEME OF EXAMINATION

S. No	Board of Study	Subject Code	Subject	Period/week in Hours			Scheme of Examination					Credit L+(T+P)/2	
				L	T	P	Theory			Practical			Total Marks
							ESE	CT	TA	ESE	TA		
1.	Mining Engg.	239511 (39)	Advance Mining Geology	5	1	-	100	20	20	-	-	140	6
2.	Mining Engg.	239512 (39)	Mine Fires, Explosion, Inundation, Rescue and Recovery	4	1	-	100	20	20	-	-	140	5
3.	Mining Engg.	239513 (39)	Winning and Working Metals	4	1	-	100	20	20	-	-	140	5
4.	Mining Engg.	239514 (39)	Mine Machinery and Maintenance	4	2	-	100	20	20	-	-	140	5
5.	Mining Engg.	239515 (39)	Drilling and Blasting practices in mines	4	2	-	100	20	20	-	-	140	5
6.	Mining Engg.	239521 (39)	Advance Mining Geology (Lab)	-	-	2	-	-	-	50	20	70	1
7.	Mining Engg.	239522 (39)	Mine Fires, Explosion, Inundation, Rescue and Recovery (Lab)	-	-	2	-	-	-	50	20	70	1
8.	Mining Engg.	239523 (39)	Mine Machinery and Maintenance (Lab)	-	-	2	-	-	-	50	20	70	1
9.	Mining Engg.	239524 (39)	Industrial Training	-	-	1	-	-	-	50	40	90	1
<b>Total</b>				21	7	7	500	100	100	200	100	1000	30

L: Lecture Hours, T: Tutorial Hours, P: Practical Hours,  
ESE: End Sem Exam, CT: Class Test, TA: Teacher's Assessment

\* Industrial Training: Students will undergo on industrial practical training for 2 & 1/2 months during 5<sup>th</sup> semester

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) SEMESTER : V  
 B) SUBJECT TITLE : ADVANCE MINING GEOLOGY  
 C) CODE : 239511 (39)  
 D) BRANCH/DISCIPLINE : MINING ENGG.  
 E) RATIONAL :

After Understanding the basic knowledge of contents covered in applied geology of second year is essential for a Mining student to know how the depositions of various modes of coal and other metal deposits which are to be considered for mining operations.

In final year student will be made acquainted with the various method of prospecting of mineral deposits, their mode of formation, common deposits of mineral in India ; various economical sources of deposits like petroleum and coal; for a mining student it is a very much essential to go through the technical aspect of the deposits in the Earth before its extraction to cope-up with the problems associated for mining extraction methods.

The course is designed to suit the level of student knowledge and it is expected that student will be able to carry out the best of the course content.

## F) TEACHING AND EXAMINATION SCHEME:

Sl. No.	Course Code	Periods/ week (In Hrs.)			Scheme of examination						Credit L+(T+P)/2
		L	T	P	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
1.	239511 (39)	5	1	-	100	20	20	-	-	140	6
2.	239521 (39)	-	-	2	-	-	-	50	20	70	1

L - Lecture hours, T - Tutorial hours, P - Practical hours  
 ESE -End of Semester Exam, CT - Class Test, TA- Teacher's Assessment

## G) DISTRIBUTION OF MARKS AND HOURS :

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Indian stratigraphy	16	16
2.	2	Ore deposits	16	16
3.	3	Coal and Petroleum	16	16
4.	4	Ores and mineral deposits of India	16	16
5.	5	Prospecting methods	14	16

6.	6	Ground water	09	10
7.	7	Remote sensing	09	10
Total			96	100

## H) DETAILED COURSE CONTENTS:

### CHAPTER – 1 INDIAN STRATIGRAPHY

- 1.1 Geological Time scale, Principles of stratigraphy, Principle of correlation, Stratigraphic classification of Indian rock formations.
- 1.2 Physiographic division India, peninsular India, Indo-gangetic plan and extra peninsular India.
  - 1.3 Archaean system – A brief account of the Dharwar system, Sausor group, Iron-ore group, Archaean rocks of Rajasthan, economic minerals of Archaean rocks.
- 1.4 Cuddapah system – Cuddapah rocks of cuddapah basin Andhra pradesh, Delhi system, economic minerals of cuddapah rocks.
- 1.5 Vindhyan system - A brief account of the vindhyan rocks of North India, economic minerals of vindhyan rocks.
- 1.6 Gondwana system - A brief account of the gondwana rocks of India, economic minerals of gondwana rocks.
- 1.7 Deccan traps - A brief account of the deccan traps of India, economic importance of deccan traps.
- 1.8 Fossils – Definition, mode of occurrence, use of fossils.

### CHAPTER-2 ORE DEPOSIT

- 2.1 Concept of mineral, Gangue and Tenor of ores, a brief outline of the classification of ore deposits.
- 2.2 Magmatic ore deposit – Early magmatic, Late magmatic.
- 2.3 Pegmatic deposits, Sublimation deposits, Contact metasomatic deposits,
- 2.4 Hydrothermal deposits – classification of hydrothermal deposits, cavity filling deposits, types of cavity filling deposits, replacement deposits, types of replacement deposits.
- 2.5 Sedimentation deposits, Evaporation deposits, Residual deposits, Mechanical concentration deposits (Placer deposits), types of placer deposits.
- 2.6 Oxidation and super gene enrichment deposits, metamorphic deposits.
- 2.7 Control of ore deposition – Structural controls, stratigraphic control, physical and chemical controls.

### CHAPTER -3 COAL AND PETROLEUM

- 3.1 Rank of coal, classification of coal – Peat, Lignite, Bituminous, Anthracite and Cannel coal.

- 3.2 Banded constituents of coal, chemical properties of coal, structural features of coal seams.
- 3.3 Origin of coal – In situ theory, Drift theory, formation of coal preservation, Biochemical change, Carbonization and metamorphism.
- 3.4 Occurrence of coal in India, A brief outline of the lower gondwana fields.
- 3.5 Petroleum, origin of petroleum, migration of petroleum, oil traps, types of oil traps, petroleum deposits of India.

**CHAPTER- 4 ORES AND MINERAL DEPOSITS OF INDIA**

- 4.1 A brief account of the origin, occurrence, distribution in India and economic use of the following ores and minerals – Gold, Iron-ore, Manganese ore, Copper ore, Lead and Zinc ore, Aluminum ore, Chromite and Mica.

**CHAPTER – 5 GROUND WATER**

- 5.1 Elementary idea of ground water, occurrence of ground water, zone of aeration, saturation, star table, hydrological properties of rocks porosity and permeability, Aquifer.

**CHAPTER – 6 PROSPECTING METHODS**

- 6.1 Ground prospecting methods – A brief outline of the various prospecting methods, surface prospecting methods, Geological mapping, and Trenching, Pitting, Auguring and wash boring and drilling.
- 6.2 Geophysical prospecting methods – Elementary study of gravity, magnetic, electrical resistivity and seismic methods of geophysical prospecting.

**CHAPTER – 7 REMOTE SENSING**

- 7.1 Remote sensing an introduction, application in various fields, G.P.S.(Global Positioning System), G.I.S.(Geographic Information System).

**I) SUGGESTED INSTRUCTIONAL STRATEGIES**

- : Lecture method
- Industrial visit
- Expert lecture
- Demonstration

**Reference Books –**

Sl.No.	Title	Author, Publisher, Edition and Year
1.	A text book of Geology	K.M.Banger
2.	Engineering and general Geology	Prabin Singh
3.	Ore deposits of India	Gokhle and Rao
4.	Geology of India and Burma	Krishnan M.S.
5.	Ground water and tube well	S.P.Garg
6.	Mineral Economics	Sinha and Sharma

7.	Industrial minerals	R.K.Sinha
8.	Geology of India	D.N.Wadia
9.	Ground water hydrology	Todd
10.	Economic mineral deposits	A.M Batteman
11.	Ground water	Tolman
12.	Geology of Petroleum	A.I.Levorsen
13.	Petroleum resources and development	Khan
14.	Hydrology	G.Mahajan
15.	Petroleum Geology	North F.K.
16.	A text book of Geology	P.K.Mukharjee
17.	A text book of Remote sensing	S.S.Agrawal
18.	Dictionary of Remote sensing	S.M.Rashid
19.	vkfFkZd Hkw foKku	O;kl
20.	vkfFkZd Hkw foKku	

**Others –**

- VCDs
- Video cassettes
- Learning packages

**Subject: Advance Mining Geology Lab**

**Practical Code: 239521 (39)**

**Hours: 32**

**LIST OF PRACTICALS / TUTORIALS**

1. Sketching and describing the various geomorphological and structural models.
2. Constructing the geological cross section from geological maps
  - i) Maps showing unconformity
  - ii) Maps showing Folds
  - iii) Maps showing Faults
  - iv) Maps showing Igneous intrusions
3. At least three exercises on maps of completion of outcrops.
4. Study of common ore minerals in hand specimen – Al, Fe, Cr, Mg, Mn, Zn, Pb, Sn, Sb, Cu, and Arsenic.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI**

- A) SEMESTER : V  
 B) SUBJECT TITLE : MINE FIRES, EXPLOSION, INUNDATION,  
 RESCUE AND RECOVERY  
 C) CODE : 239512 (39)  
 D) BRANCH /DISCIPLINE : MINING ENGG.  
 E) RATIONAL:

Mining industry is one of the industries causing environmental pollution and chances of sever accidents. Certain bindings are imposed through regulations on mining industry for safe workings and to control hazards associated with mines. student are required to be more acquainted with the major Problems associated for mine worker in connection with comfortable working conditions and various sources of problem creating agents.

This paper deals with common causes of accidents arising due to noxious and inflammable gases; dust and water ; apart from this the knowledge of rescue and recovery of mine workers after an accident is more essential for a student to overcome with the problem. knowledge of these hazards and their prevention will be imparted through the teaching and appreciation of the following topics in details ;

- i. Mine fires.
- ii. Gas explosion
- iii. Dust explosion
- iv. Inundation.
- v. Rescue and recovery work

**F: TEACHING AND EXAMINATION SCHEME:**

Sl. No.	Subject Code	Periods/week (In Hrs.)			Scheme of examination						Credit L+(T+P)/2
		L	T	P	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
1.	239512 (39)	4	1	-	100	20	20	-	-	140	5
2.	239522 (39)	-	-	2	-	-	-	50	20	70	1

F) L - Lecture hours , T - Tutorial hours, P - Practical hours  
 ESE -End of Semester Exam, CT - Class Test, TA- Teacher's Assessment

**G) DISTRIBUTION OF MARKS AND HOURS :**

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Mine fires	16	20
2.	2	Gas explosion	16	20
3.	3	Dust explosion	16	20
4.	4	Inundation	16	20

5.	5	Mine Rescue & Recovery work	16	20
Total			80	100

#### CHAPTER- 1 MINE FIRES –

- 1.1 Factors responsible for mine fire.
- 1.2 Causes of mine fire.
- 1.3 Accidental fire, spontaneous heating; factors responsible for spontaneous heating.
- 1.4 Incubation period, crossing point, ignition point.
- 1.5 Precaution against spontaneous heating.
- 1.6 Preventive measures against mine fires.
- 1.7 Fire stoppings-purpose, constructional details.
- 1.8 Opening of a sealed of area.

#### CHAPTER- 2 GAS EXPLOSION

- 2.1 Types of gas explosion.
- 2.2 Causes of fire damp explosion.
- 2.3 Upper and lower limit of fire damp explosion ; coward's diagram.
- 2.4 Precaution against fire damp explosion.
- 2.5 Study of some important gas explosion in Indian coal mines.

#### CHAPTER- 3 DUST EXPLOSION

- 3.1 Upper and lower limit of inflammability of dust.
- 3.2 Index of inflammability.
- 3.3 Causes of formation of dust and causes of coal dust explosion.
- 3.4 Study of some important dust explosion cases in Indian coal mines.
- 3.5 Precaution & preventive measures against dust explosion.
- 3.6 Stone dust quality of stone dust; stone dusting; stone dust barriers.
- 3.7 Water barriers, handling of stone dust.
- 3.8 Use of chemicals and chemical foams against coal dust hazards, health hazards due to coal dust,
- 3.9 Measurement of coal dust concentration in general body of air.

#### CHAPTER- 4 INNUNDATION

- 4.1 Sources of dangerous accumulation of water in mines.
- 4.2 Factors responsible for innundation in mines.
- 4.3 Precautions and preventive measures for innundation.
- 4.4 Precaution for approaching water logged areas and working below water logged area.
- 4.5 Dams – Purpose, site of dam, types of dam and their constructional details.
- 4.6 Study of some important innundation cases in Indian mines.

4.7 Additional precaution in rainy season in the mines located near by the rivers.

#### CHAPTER -5 MINE RESCUE AND RECOVERY WORK

- 5.1 Rescue apparatus, self breathing apparatus, reviving apparatus, Drager  
BG – 4 self contained breathing apparatus, Maxaman- reviving apparatus, self contained, self rescuer – Fenzy biocell, Oxybocks, RZ-25,  
Universal tester for testing of drager BG-174 and BG-4, Quester-II and  
Quester-III, Computerised testing machines, Drager power pump.
- 5.2 Rescue stations – equipments used in rescue station, rescue organisation and working, training of officials.
- 5.3 Method of rescue and recovery work
- 5.4 Emergency organisation and rescue plan
- 5.5 Recovery of mines after explosion, fire and innundation
- 5.6 Sealing of fire area (u/g fire)

#### Reference Book

Sl.No.	Title	Author, Publisher, Edition and Year
1.	Elements of mining technology –Vol-II	D.J. Deshmukh
2.	Mine Disaster and Mine rescue	M.A.Ramlu

**Subject: Mine Fires, Explosion, Inundation, Rescue and Recovery Lab**

**Practical Code: 239522 (39)**

**Hours: 32**

#### LIST OF PRACTICALS:

1. To study, sketch and explain different types of fire stoppings and their constructional details.
2. To study, sketch and describe about stone dust and stone dust barriers.
3. To study, sketch and describe different types of dams.
4. To visit Rescue Station, study and explain different types of rescue apparatus.
5. To study, sketch and describe First Aid Station and Fresh Air Base.



**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI**

**A) SEMESTER** : **V**  
**B) SUBJECT TITLE** : **WINNING AND WORKING METALS**  
**C) CODE** : **239513 (39)**  
**D) BRANCH /DISCIPLINE** : **MINING ENGG.**  
**E) RATIONAL** :

Though the present trend of Mining is for open cast mining to meet the hung national target but the importance of underground mining can not be ignored, the deep deposits of coal or metalliferous minerals can not be worked, but by underground mining. it is also a fact that accident ratio are more in under-ground mining than in open cast mining , yet where the OB ratio is beyond working limit, under ground mining become necessity.

As such the student should be well acquainted with the under ground mining both for coal and metal in this subject. other aspect of underground mining (coal) are dealt which are not covered previously . Similarly U/G mining ( metalliferous) are also included to make a diploma pass out in mining perfect.

**C) TEACHING AND EXAMINATION SCHEME :**

Sl. No.	Course Code	Periods/week (In Hrs.)			Scheme of examination						Credit L+(T+P)/2
		L	T	P	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
1.	239513 (39)	4	1	-	100	20	20	-	-	140	5

F) L - Lecture hours , T - Tutorial hours, P - Practical hours  
 ESE -End of Semester Exam, CT - Class Test, TA- Teacher's Assessment

**G) DISTRIBUTION OF MARKS AND HOURS :**

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Irregular deposits	16	20
2.	2	Mode of entry	16	20
3.	3	Preparatory work	16	20
4.	4	Stoping	16	20
5.	5	Study of important Metalleferous U/G Mines	16	20
Total			80	100

**CHAPTER- 1**      **IRREGULAR DEPOSITS (Metalliferous ores)**  
 1.1    Nature of ore deposits.  
 1.2    Mode of ore deposits.

- 1.3 Lode, vein etc.
- CHAPTER- 2 MODE OF ENTRY
- 2.1 shaft-shape and size, circular, rectangular or elliptical.
- 2.2 Incline
- 2.3 Inclined shaft.
- 2.4 shaft filling
- CHAPTER- 3 PREPARATORY WORK
- 3.1 formation of stations, cross cuts, ore bins, greizzlies etc.
- 3.2 Level and raise winz connections, ore blocks.
- 3.3 Transportation of Broken ore from stope to surface.
- 3.4 Primary crushing under ground
- CHAPTER- 4 STOPING
- 4.1 Various methods of stoping, their suitebilities , conditions of applicability and methods of stoping.
- 4.2 Open stopes.
- 4.3 Under hand, over hand and breast stoping.
- 4.4 Supported stopes –
1. Cut and fill stoping
  2. Shrinkage stoping
  3. Square set stoping
  4. Sub level stoping
  5. Glory holes
- 4.4 Caving methods of stoping .
- a. Sub level caving.
  - b. Block caving
  - c. Top slicing
- CHAPTER- 5 STUDY OF IMPORTANT METALLEFEROUS U/G MINES
- 5.1 Kolar gold mines- problems of deep mining.
- 5.2 Manganese ore mine- Bherveli ( Balaghat).
- 5.3 Mosabani copper mines.
- 5.4 Khetri copper mines.

H) SUGGESTED INSTRUCTIONAL STRATEGIES :

- Lecture method
- Industrial visit
- Expert Lecture
- Demonstration

F) SUGGESTED LEARNING RESOURCES :

**Reference Books –**

Sl.No.	Title	Author, Publisher, Edition and Year
1.	Mines planning for coal	S.P. Mathur
2.	Surface Mining Technology	Sameer Kumar DGS
3.	MordernCoal mining Technology	-- --
4.	Coal mine ground control Vol- II	Syd. S. Peng
5.	Under ground Winning of coal	T.N. Singh
6.	Mine Working Part I & II	H.N. Karmkar

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI**

- A) SEMESTER : V  
 B) SUBJECT TITLE : MINE MACHINERY & MAINTENANCE  
 C) CODE : 239514 (39)  
 D) BRANCH /DISCIPLINE : MINING ENGG.  
 E) RATIONAL :

Modern trend towards mining industry is to achieve higher productivity with employment of winning machineries in mines, with this regard various mining machines for drilling, Extraction, Loading, Transport and other mining operation are being used in mines; thus the knowledge of operation, maintenance and main features of the machines is very essential for a mining student for proper management .

The subject covers all basic aspects of different machineries and their accessories; and deals with wire ropes; winding systems; coal face mechanization , compressed air machines, gate and box. the subject also reveal with maintenance part of the machines.

F) TEACHING AND EXAMINATION SCHEME :

Sl. No.	Course code	Periods/week (In Hrs.)			Scheme of examination						Credit [L+(T+P)/2]
		L	T	P	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
1.	239514 (39)	4	2	-	100	20	20	-	-	140	5
2.	239523 (39)	-	-	2	-	-	-	50	20	70	1

L - Lecture hours , T - Tutorial hours, P - Practical hours  
 ESE -End of Semester Exam, CT - Class Test, TA- Teacher's Assessment

G) DISTRIBUTION OF MARKS AND HOURS :

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Wire Ropes	12	20
2.	2	Winding	12	10
3.	3	Coal face mechanisation	12	20
4.	4	Gate and box	12	10
5.	5	Compressed air machines	12	10
6.	6.	Aerial ropeways	12	10
7.	7.	Concept of preventive maintenance	12	10
8.	8.	Mine transport systems	12	10
Total			96	100

H) DETAILED COURSE CONTENTS :

- CHAPTER- 1 WIRE ROPES
- 1.1 Types of wire ropes- winding, haulage and guide ropes.
  - 1.2 constructional details of wire ropes; rope laying.
  - 1.3 Testing of wire ropes: calculation of size of ropes: factor of safety: rope troubles.
  - 1.4 capping and recapping of ropes.
  - 1.5 splicing of haulage ropes: factor of safety.
  - 1.6 Care and maintenance of wire ropes in use and its storage.
- CHAPTER- 2 WINDING
- 2.1 Different type of winders.
  - 2.2 Head gear: head gear sheave, different type of rope cattles , suspension gear, rope cattles, safety hooks.
  - 2.3 Breaks-post brake, cage and its fitting kee gears, rigid & flexible rope guides: suspension of rope guides.
  - 2.4 Over wind & over speed prevention.
  - 2.5 Factors governing height of the head-gear: dead load: live load and wind pressure.
- CHAPTER- 3 COAL FACE MECHANISATION
- 3.1 Face mechanisation (B & P) classification
  - 3.2 Electric coal drill
  - 3.3 Loaders-Powers loaders, operation and use.
  - 3.4 L.H.D. and S.D.L ., operation and uses.
  - 3.5 Longwall face mechanisation  
stage loads, AFC, Crush
- CHAPTER- 4 GATE END BOX
- 4.1 Purpose of re-mote control.
  - 4.2 General Principle of working of gate end box .
  - 4.3 Protection of machineries through re-mote control .
  - 4.4 Flame proof and intrinsic safety.
- CHAPTER- 5 COMPRESSED AIR MACHINES
- 5.1 Compressed air power, comparison, and compressors.
  - 5.2 Different kind of compression and compressors.
  - 5.3 Calculation of work done and H.P. for given pressure and quantity of free air.
  - 5.4 Efficiency of compressors.
  - 5.5 Advantage and limitation of compressed air power over electrical power.
  - 5.6 Compressed air machines used in mines drills : air leg, pneumatic picks etc.
- CHAPTER- 6 INTRODUCTION TO AERIAL ROPEWAYS
- 6.1 Different types of aerial ropeways.
  - 6.2 Monocable and bicable ropeways.

	6.3	Suitability and use.
CHAPTER- 7	CONCEPT OF PREVENTIVE MAINTENANCE	
	7.1	Concept of preventive maintenance and its importance.
CHAPTER- 8	MINE TRANSPORTATION SYSTEM	
	8.1	Belt conveyor , Chain conveyor
	8.2	Transport system for U/C mining

**Reference Book**

Sl.No.	Title	Author, Publisher, Edition and Year
1.	Elements of Mining Technology	D,J. Deshmukh
2.	Science and Art of Mining Digest	C.M.P.D.I. Pub.
3.	Mine Transport	Karelin
4.	Heat Engine	Pandya & Shah
5.	Course in mining Geology	R.N.P.Arogyswamy

**Subject: Mine Machinery and Maintenance Lab**

**Practical Cole: 239523 (39)**

**Hours: 32**

**LIST OF PRACTICALS:**

1. To study, sketch and describe different types of wire ropes used in mines.
2. To study, sketch and describe different types of winding systems used in mines.
3. To study, sketch and describe electric coal drills, power loaders, long wall face machineries, stage loaders, AFC, crushers, etc.
4. To describe the layout, plan of operation and safety measures of any mechanisation observed during training in mines.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI**

- A) SEMESTER : V  
 B) SUBJECT TITLE : DRILLING AND BLASTING PRACTICES IN MINES  
 C) CODE : 239515 (39)  
 D) BRANCH /DISCIPLINE : MINING ENGG.  
 E) RATIONAL :

Working knowledge of drilling and blasting practice carried out in mines is very important for mining supervisor. This subject aims at providing useful practical information and practices adopted in mines.

b. TEACHING AND EXAMINATION SCHEME:

Sl.No.	Course Code	Periods/week (In Hrs.)			Scheme of examination						Credit L+(T+P)/2
		L	T	P	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
1.	239515 (39)	4	2	-	100	20	20	-	-	140	5

F) L - Lecture hours , T - Tutorial hours, P - Practical hours  
 ESE -End of Semester Exam, CT - Class Test, TA- Teacher's Assessment

G) DISTRIBUTION OF MARKS AND HOURS :

S. No.	Chapter No.	Chapter Name	Hours	Marks
1.	1	Explosive energy and breakage mechanism.	25	30
2.	2	Surface blasting	25	25
3.	3	Underground blasting	16	15
4.	4	Rock fragmentation	15	15
5.	5	Environment impact of blasting	15	15
Total			96	100

**CHAPTER- 1 EXPLOSIVE ENERGY AND BREAKAGE MECHANISM**

- 1.1 Explosive energy, work energy, waste energy . Brakage mechnism, various theories of rock breakage
- 1.2 Type of explosive ,- low explosive, high explosive, Permitted explosive .

- 1.3 Detonators, types of detonators, detonating fuses, Electric detonator, advantage, precautions in handling
- 1.4 Misfires, precautions, statutory provisions related to shot firing

CHAPTER-2 SURFACE BLASTING

- 2.1 Factors affecting blast design, selection of various blast parameters, Burden, Spacing, Stemming distance, Sub grade drilling, depth of hole, bench height, diameter of hole,
- 2.2 Different types of explosives used in o/c mines, Liquid Oxygen, ANFO, O.C.G., Slurries, SMS, Emulsion explosive
- 2.3 Deck charging and column loading, calculation of charge per hole and powder factor, controlled blasting, special blasting technique.
- 2.4 Secondary blasting – Pop shooting and Plaster shooting
- 2.5 Ground vibration measurement – is limitations

CHAPTER-3 UNDERGROUND BLASTING

- 3.1 Various cuts, Burden, spacing, depth of hole, stemming of hole, precaution during blasting.
- 3.2 Solid blasting practice.

CHAPTER- 4 ROCK FRAGMENTATION

- 4.1 Mechanism of rock fragmentation,
- 4.2 factors affecting rock fragmentation,
- 4.3 Techniques to improve rock fragmentation

CHAPTER- 5 ENVIRONMENTAL IMPACT OF BLASTING

- 5.1 Back break, Over break, fly rock, Ground vibration- measurement,
- 5.2 Prediction & control measures, air blast, noise

**Reference Book**

Sl.No.	Title	Author, Publisher, Edition and Year
1.	Elements of mining technology –Vol-I	D.J. Deshmukh
2.	Explosive & Blasting Practice in mines	Sameer Kumar Das
3.	Open cost mining	Sameer Kumar Das
4.	Explosive & Blasting Practice in mines	Pradhan
5.	Open cost mine working	B. Ghosh

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- A) SEMESTER : V**  
**B) SUBJECT TITLE : INDUSTRIAL TRAINING**  
**C) CODE : 239524 (39)**  
**D) BRANCH/DISCIPLINE : MINING ENGG.**

**E) RATIONALE:**

Industrial Training is one of the most essential components for a diploma graduate in Mining and Mine Surveying. The sole purpose of industrial training is to expose the students to “real life” situations. Different aspect of mining such as geology, exploration, selection of method of working, selection of machines for mining, environmental controls and measures, safety in mines and various statutory provisions can only be understood when the students are exposed to different mine workings. Students will cover different coal and metal mines both underground and opencast in such a way that at the end of the completion of diploma programme, they are conversant with different mining conditions. Industrial training also opens avenues of new learning to the students and apply them during their project and industrial training presentations.

**F) TEACHING AND EXMINATION SCHEME:**

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit L+(T+P)/2
	L	T	P	Theory			Practical		Total Marks	
ESE				CT	TA	ESE	TA			
239524 (39)	-	-	1	-	-	-	50	40	90	1

**Note:** Student will undergo on industrial practical training for 2 months after/before end of semester examination

L : Lecture hours : T : Tutorial hours, P : Practical hours



ESE – End of Semester Exam.; CT – Class Test; TA- Teacher’s Assessment of the Training Report.

**G) DISTRIBUTION OF MARKS AND DURATION:**

<b>Sl. No.</b>	<b>Items</b>	<b>Duration</b>	<b>Marks</b>
1	<i>Preparation of report format</i>	2 Hrs	15
2	Industrial Training	08 Weeks	20
3	Report Writing	01 week	15
4	Report Presentation	-	-
5	Seminar	-	20
6	End of the semester exam viva voce	-	20
<b>TOTAL</b>		<b>09 Weeks</b>	<b>90</b>

Before going for training, the students will prepare various formats for data collection based on the topic of training assigned to them. The students will be given specific assignments for the period of training. During the course of training students will complete weekly report, assignments and keep weekly attendance updated. On completion of training each student will submit a report of training and make a presentation before the group of students. Teacher assessment will be done during the training, on presentation of training and at the end of semester examination. A seminar will be organized on specific topics identified by the teacher and the students will present their experiences earned during the training on the specific tasks. End of the semester examination will be an external exam.